

National Institute for Occupational Safety and Health (NIOSH)

Safety and health at work for all people through research and prevention

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*Safety & Health Learning Alliance / NASA Safety Center
December 5, 2013*

“The findings and conclusions in this report/presentation have not been formally disseminated by the National Institute for Occupational Safety and Health and should not be construed to represent any agency determination or policy.”





OSH Act 1970

NIOSH is the federal agency responsible for conducting *research* and making *recommendations* to prevent work-related injury, illness, & death.

What's wrong with this picture?
No apparent fall protection.

Mission of NIOSH



Generate new knowledge in the field of occupational safety and health

Transfer that knowledge into workplace practice

Prevent work-related injury, illness, and death

Knowledge is typically generated in the form of information, interventions, or technological innovations.

Injury & Illness Statistics

Greater than 154 million people are employed in the U.S. civilian workforce

Approximately 9,000 workers are injured on the job every day

Approximately 13 workers die *every day* from a fatal work-related injury



Injury & Illness Statistics



In 2011, **4,693** workers died from work-related injuries

- preliminary CFOI data from US BLS reports 4,383 for 2012

More than and estimated **53,000** work-related illnesses resulted in death; approximately **146** people die daily from such illnesses (2007). Most illnesses are not captured by national surveillance systems.

In 2011, about **4 million** non-fatal injuries and illnesses were reported (likely an underestimate of actual injuries and illnesses occurring).

2.9 million work-related injuries were treated in emergency departments, resulting in 150,000 hospitalizations, in 2011.


Estimated Cost

- The societal cost of work-related fatalities, injuries, and illnesses was estimated at \$250 billion in 2007.
 - Calculation was based on methods that focus on medical costs and productivity losses.
 - Methods that include consideration of pain and suffering would result in a higher estimated cost to society.
- In 2007, the amount employers spent on wage payments and medical care for workers hurt on the job was an estimated \$88 billion.

Overall Measures of the Economic Burden of Worker Injuries and Illnesses				
Source	Year for which estimate was calculated	Burden estimate in 2010 dollars	Predominant perspective	Examples of major cost components included
Leigh ^a	2007	\$263 Billion (total) \$6 Billion (fatal injuries) \$196 Billion (nonfatal injuries) \$48 Billion (fatal illness) \$13 Billion (nonfatal illness)	Societal	Medical costs as part of workers' compensation and national health expenditure estimates Productivity losses at work and home Indemnity payments as part of workers' compensation Labor turnover, hiring and training for replacement workers Workers' compensation administrative costs Non workers' compensation administrative costs
Sengupta et al. ^b	2007	\$88.2 Billion	Employer	Workers' compensation

^a Leigh JP. [Economic Burden of Occupational Injury and Illness in the United States](#) (), Milbank Quarterly 2011. 89(4):728–772.

^b Sengupta I, Reno V, Burton JF Jr. [Workers' compensation: benefits, coverage, and costs, 2007](#) .

 Washington, DC: National Academy of Social Insurance; 2009.

Research vs. Regulation

Research & Recommendations

Dept. of Health & Human Services



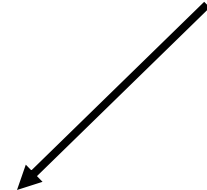
**Centers for Disease
Control & Prevention (CDC)**



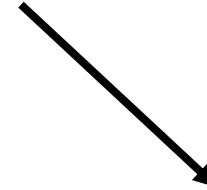
NIOSH

Regulation & Enforcement

Dept. of Labor



**Mine Safety
and Health
Administration
(MSHA)**



**Occupational
Safety and Health
Administration
(OSHA)**

Locations



Atlanta, GA

Washington, DC

Anchorage, AK

Cincinnati, OH

Denver, CO

Morgantown, WV

Pittsburgh, PA

Spokane, WA

Institute Capabilities (not an exhaustive list)



- Aerosol science
- Analytical and sampling method development
- Biomonitoring
- Emergency response
- Engineering controls
- Establishment of causes & mechanisms of disease & injury
- Firefighter fatality investigations
- Fatality assessment and control evaluations
- Hazard evaluations
- Hearing loss prevention
- Motor vehicle and transportation safety
- Musculoskeletal disorders
- Personal protective technologies
- Respirator certification
- Risk assessments and recommended exposure limits
- Short and long-term lab studies and field investigations
- Statistical analyses
- Surveillance (Identify and track work exposure and illness)
- Traumatic injuries
- Work organization and stress-related disorders

Partnership Portfolio

- More than 1900 recorded partnerships
 - Most are informal arrangements at the project/research level,
 - 108 are formal agreements (e.g., Memorandum of Understanding)
- 30+ federal agencies, with more than 640 recorded activities
- More than 85 international collaborators
- Participating in at least 25 national/international Voluntary Consensus Standards bodies (*130 unique/approved activities*)



Recent Collaborations with NASA

- Flight Crew Studies (*DSHEFS*)
- New Technologies & Equipment for Mine Safety & Health (*OMSHR*)
- MINER Act and Capacity Building Contracts and Grants; and Interagency Working Group (*OMSHR*)
- Investigation of Enhanced Refuge Alternatives (*OMSHR*)
- Advancing Respiratory Protective Device Technology through Breathing Gas Chemical Research (*NPPTL*)
- Develop the Process and Tools to Expand NASA's "buy quiet" Program (*DART*)
- Noise Control for Construction and Manufacturing Industries (*DART*)
- Development of New Research Initiatives in Occupational Health (*HELD*)
- Memorandum of Understanding between NIOSH and NASA/LJ Space Center
- Interagency Agreements (2) – Pulmonary response to carbon nanotubes/lunar dust



Institute-Wide Programs

Health Hazard Evaluation (HHE)

Respirator Certification Program

Research to Practice (r2p)

Prevention through Design (PtD)

Total Worker Health (TWH)

Center for Motor Vehicle Safety

Center for Workers Compensation Studies

National Occupational Research Agenda (NORA)

Nanotechnology Research Center

Electronic Media

- Twitter (*14 accounts / 251,000 followers*)
- Facebook (*2 accounts / 19,000 likes*)
- Pinterest (*CDC's Workplace Safety & Health Board*)
- YouTube
- Flickr
- eNews monthly newsletter
- Science Blog
- LinkedIn

The screenshot displays the official website of the National Institute for Occupational Safety and Health (NIOSH). At the top, the CDC logo and the text 'Centers for Disease Control and Prevention' are visible, along with the tagline 'CDC 24/7: Saving Lives. Protecting People.™'. The NIOSH logo is prominently featured in the center, with the text 'The National Institute for Occupational Safety and Health (NIOSH)' and 'Providing National and World Leadership to Prevent Workplace Illnesses and Injuries' below it.

The website is organized into several main sections:

- News and Events:** Includes links to resources for responders to the Midwest tornadoes, resources for responders to Typhoon Haiyan, new 'Women in Science' videos, and a NIOSH study of firefighters finding increased rates of cancer.
- Publications & Products:** Lists the NIOSHTIC-2 Research Database, NIOSH-issued publications, and various documents for public review.
- Research Programs:** Details the NIOSH Program Portfolio, National Academies Evaluation of NIOSH Programs, and research agendas for NORA, Respirators and Protective Technology, Radiation Dose Reconstruction, and Total Worker Health.
- Workplace Safety and Health Topics:** A grid of links covering industries & occupations, hazards & exposures, diseases & injuries, chemicals, safety & prevention, and emergency preparedness & response.
- Key Resources:** Provides links to the NIOSH Pocket Guide to Chemical Hazards, NIOSH Manual of Analytical Methods, and NIOSH Data and Statistics Gateway.

On the right side, there are additional features including a search bar, a 'Quick Links' section, a 'Science Blog' section, and contact information for NIOSH, including a toll-free number (800-CDC-INFO) and a TTY number.

Sample Impacts from NIOSH Research



- Change in legislation
- Adoption of workplace interventions and prevention programs
- Licensing agreements to manufacture and distribute technological innovations
 - Establishment/revision of Voluntary Consensus Standards—both national and international standards
 - Change in policy

Continuing Challenges

- Composition of US workforce is becoming increasingly diverse
- Workplaces are rapidly evolving & changing the way work is organized
 - Shift from manufacturing to services (80%)
 - Longer hours, compressed work weeks, shift & temp work, reduced job security
 - New chemicals, materials, processes, & equipment are being developed and marketed at an ever-accelerated pace



What is an HHE?

- Worksite investigation in response to a request from employees, employers, or unions
 - Employees can submit confidential requests
- Determine whether harmful exposures, processes, or conditions exist or cause injuries or illnesses
 - Chemicals, biologicals, physical hazards (e.g., noise, ergonomics, non-ionizing radiation, heat stress), safety climate, etc.
 - Acute and chronic illnesses and injuries
 - Investigators may include industrial hygienists, ergonomists, physicians, nurses, and psychologists
- Involve employees and management at every step
- Free service (taxpayer funded)

HHEs Conducted at Federal Agencies Over the Past 5 Years

- Department of Veterans Affairs
- Department of Interior
- Department of Defense
- Department of Energy
- Department of Justice
- Department of Agriculture
- Department of Homeland Security
- Department of Transportation
- Department of Commerce
- General Services Administration
- Environmental Protection Agency
- US Postal Service

Since 1970, NIOSH has conducted HHEs at 1,610 federal agencies (~10% of all HHEs).



One Example

- Immigration and Customs Enforcement
- Concerned about tuberculosis infections among employees at a detainee holding facility
- We screened employees for latent TB infection and assessed the ventilation system
- We made recommendations on how to modify/improve the ventilation system, start a TB screening program, implement a respiratory protection program, and improve training

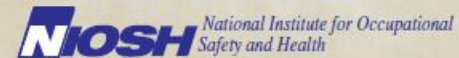


Evaluation of Exposure to Tuberculosis Among Immigration Employees

Marie A. de Perio, MD
R. Todd Niemeier, MS, CIH

Health Hazard Evaluation Report
HETA 2009-0074 and HETA 2009-0193-3114
U.S. Immigration and Customs Enforcement
Detention and Removal Operations
Chicago, Illinois
Broadview, Illinois
September 2010

Department of Health and Human Services
Centers for Disease Control and Prevention



All reports are available at <http://cdc.gov/niosh/hhe>

Since 2011, company names are not listed on the reports

For More Information About HHEs

CDC Home
Centers for Disease Control and Prevention
CDC 24/7: Saving Lives. Protecting People.™

NIOSH
NIOSH Home

Health Hazard Evaluations

NIOSH
Health Hazard Evaluation Program Home

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National Institute for Occupational Safety and Health (NIOSH)
Centers for Disease Control and Prevention
800-CDC-INFO
(800-232-4636)
TTY: (888) 232-6348
New Hours of Operation
8am-8pm ET/Monday-Friday
Closed Holidays
Contact CDC-INFO

File Formats Help:
How do I view different file formats (PDF, DOC, PPT, MPEG) on this site?

Page last reviewed: August 21, 2013
Page last updated: September 6, 2013
Content source: National Institute for Occupational Safety and Health Division of Surveillance, Hazard Evaluation, and Field Studies

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800-CDC-INFO (800-232-4636) TTY: (888) 232-6348 Contact CDC-INFO

USA.gov
Government Made Easy

Visit: www.cdc.gov/niosh/hhe

Like us on Facebook:

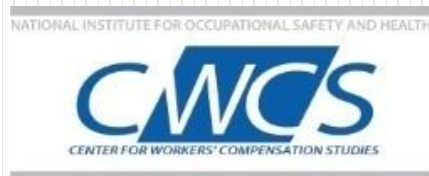
<http://www.facebook.com/health.hazard.evaluation.program>

HHE Health Hazard
Evaluation Program

NIOSH Center for Workers' Compensation Studies

Steve Wurzelbacher

srw3@cdc.gov



What is Workers' Compensation?

- Insurance systems to provide medical care and partial income protection to employees with work-related injuries/illnesses
- Provide employers financial incentives to improve safety/health
- Coverage through private insurers, state-agency compensation insurance funds, the federal government, or self-insurance
- Complex systems governed by laws in each state

Types of Workers' Compensation (WC) Data

- **Claims Information**

- Injury/illness narrative
- Nature, event/exposure, source of injury/illness
- Costs of medical care and partial wage replacement
- Length and type of disability, medical treatment, hospitalizations
- Injured worker characteristics (occupation, age, gender, time with the employer, etc.)

- **Employer Information**

- Workplace hazards
- Safety/health prevention programs and controls
- Return-to-work programs to reduce injury/illness severity

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH



CWCS Unique Role

- Established 2013 to:
 - *Integrate* NIOSH's traditional research efforts to prevent worker injury/illness with WC efforts to provide medical care and wage benefits to workers
 - *Coordinate* workers' compensation research across NIOSH
 - Prior studies usually driven by individual researchers
- Protect the health and safety of the American worker and the economic vitality of the Nation
 - OSHA Act 1970
 - "Personal injuries and illnesses arising out of work situations impose a substantial burden upon, and are a hindrance to, interstate commerce in terms of lost production, wage loss, medical expenses, and disability compensation payments"

Integrated Safety-Health Program



***Reduce
Injury/illness
frequency***

LOSS PREVENTION

***Reduce
Injury/illness
severity***

LOSS REDUCTION

CWCS Goals

- **Strategic Goal 1:** Use workers' compensation (WC) data to identify and track work-related health conditions
 - Understand the use and limits of WC data for public health
 - Identify trends in work-related injuries-illnesses
 - Focus research and prevention- *injury causation / nature, industry, occupation*
 - Provide benchmarking data for employers and insurers
- **Strategic Goal 2:** Understand and reduce risk factors for injuries/ illnesses through economic and intervention research
 - Identify evidence-based prevention approaches (primary to tertiary)
 - Identify trailing and leading indicators predictive of future injuries-illnesses
 - Starting point to understand the total economic impact of work-related injury-illness

CWCS Activities to Date

- Established virtual center with researchers across NIOSH Divisions
- Web page <http://www.cdc.gov/niosh/topics/workercomp/cwcs>
 - Established goals
 - Shared current activities/research and published workshop proceedings
- Publishing WC primer for public health professionals
 - Introduction to complex data and systems
- Offered support to NIOSH Programs

Outreach Opportunities

- CWCS will work with public and private partners to:
 - Maximize the use of WC data
 - Communicate new study findings
 - Develop new research collaborations
 - Share best study practices in WC
- Several opportunities for new partners:
 - Conferences/ Work Shops
 - 2009 <http://www.cdc.gov/niosh/docs/2010-152/>
 - 2012 <http://www.cdc.gov/niosh/docs/2013-147/>
 - Work Groups- based on CWCS goals
 - Webinars- WC Denominators, 8/20/13
 - Peer to peer networking

Current and Potential Collaborators

- Federal, State-Fund and Private WC Insurers
- State WC Bureaus
- WC Organizations
- Self-Insured Funds
- Self-Insured Private Employers
- Health Care Providers
- Other Organizations
- Academic Researchers
- Unions

CWCS Next Steps

- Encourage internal and external WC research studies
 - Identify priority prevention areas for proposals
- External outreach
 - Develop work groups aligned with CWCS goals
 - Surveillance (State outreach)
 - Prevention Effectiveness
 - Total Economic Impact
 - Disability Management
 - Conduct 1-2 webinars per work group per year
 - Plan 2015 3rd NIOSH WC Workshop

CWCS Next Steps Continued

- FY14-15 internal funding for fellow position and data management
- Continue analyses of Ohio BWC data
 - Detailed cause/ diagnoses analysis by NORA industry sector, high cost cases
 - Effectiveness of OBWC sponsored programs
 - Develop database of industrial hygiene exposure assessment data
- Investigate utility of WC data from:
 - WC Organizations (IAIABC, NCCI)
 - State-Agency WC Insurers (AASCIF members)
 - State WC Bureaus
 - Self-Insured Funds
 - Federal partners
- Collaborate on specific projects
 - Internal – External collaborators
 - External – External collaborators

Interested in Working with the CWCS?

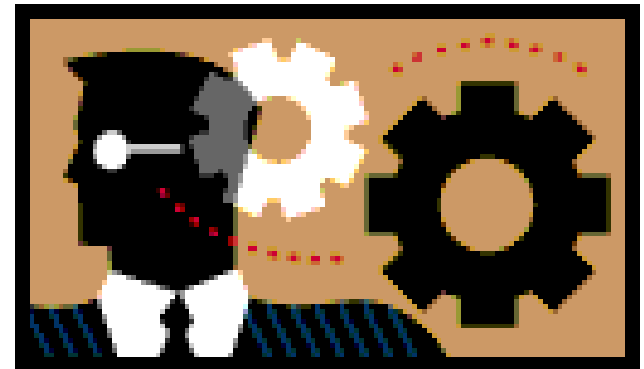
- **More information:**

- **Steve Wurzelbacher**

- srw3@cdc.gov

- **CWCS Website**

- <http://www.cdc.gov/niosh/topics/workercomp/cwcs>



Safety Climate and Safety Culture at NIOSH: Current progress in research, intervention, and training evaluation – a brief overview

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disclaimer –

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Brief summary of NIOSH activities in Safety Climate and Culture:

1. Research and intervention in the [health care and energy industries](#), beginning in the early 1990's, in the Work Organization and Stress Research Team* (Division of Applied Research and Technology – DART; [Hahn & Murphy, 2008](#))
2. Hazard recognition: Preventing falls and close calls in construction. Safety climate measures for outcome assessment, measured with pre-tests & delayed post-tests, 2006 to present. (DART; NIOSH, 2011)
3. *Accident Analysis and Prevention*, Safety Climate: New Developments in Conceptualization, Theory, and Research . Special Issue. Edited by Yueng-Hsiang (Emily) Huang (Liberty Mutual), Peter Y. Chen (Colorado State Univ.), and [James W. Grosch \(NIOSH\)](#). Volume 42, Issue 5, Pages 1421-1522 (September 2010)
4. Safety Culture in the Fire Service working group, including firefighter fatality investigations, 2010-2013 (Division of Safety Research – DSR)

***Name change from: Motivation and Stress Research Section,
Division of Biomedical and Behavioral Sciences**

Brief summary of NIOSH activities in Safety Climate and Culture - 2:

5. Assessing the Safety Culture of Underground Coal Mining, 2010 to present (Office of Mine Safety and Health Research – OMSHR)
6. Safety Climate Training for Construction Foremen, 2010 to present (DART)
7. Training to Design Age-Friendly Workplaces for Nurses, with safety climate outcome measures, 2010 to present (DART)
8. Workshop: Safety Climate Research, Intervention, and Training: Establishing a Five-Year Agenda, Orlando, FL., May, 2011 (DART)
9. Comments of the National Institute for Occupational Safety and Health on the Department of the Interior, Bureau of Safety and Environmental Enforcement Draft Safety Culture Policy Statement (Docket ID BSEE-2012-0017).*

* NOTE: *This is the only NIOSH statement on the public record regarding safety climate and culture.*

Definitions (two examples):

- A summary of molar perceptions that employees share about their work environments (safety climate, Zohar, 1980).
- Safety cultures reflect the attitudes, beliefs, perceptions, and values that employees share in relation to safety (safety culture, Cox and Cox, 1991).

Four key dimensions of Safety Climate (Hahn & Murphy, 2008), as an illustration:

1. management commitment to safety:
 - a. Workers and management work together to ensure the safest possible conditions.
 - b. There are no major shortcuts taken when worker health and safety are at stake.
 - c. The health and safety of workers is a high priority with management where I work.
2. supervisory performance feedback:
 - a. Employees are told when they do not follow good health and safety practices.
3. worker involvement in safety:
 - a. I feel free to report safety problems where I work.
4. coworker behavior norms:
 - a. New employees learn quickly that they are expected to follow good health and safety practices.

NIOSH / CPWR Safety Culture & Climate in Construction – 1:

SAFETY CULTURE:

1. Safety Culture incorporates the values and norms and beliefs of a particular company.
2. Safety Culture is a group's initiatives, actions, exercises, processes, habits, training and education and relationships, etc., that pool to establish the core principles and values of the group.
3. Safety culture is the overall mindset of what folks think about safety on the job site, that yes, we want to be a safe company.
4. Safety culture is how people act when nobody's watching.
5. Safety culture is a subset of the culture of the organization. It represents not necessarily well articulated expressions of how and why things are done within the organization.

NIOSH / CPWR Safety Culture & Climate in Construction – 2:

6. The safety culture of an organization is the product of individual and group values, attitudes, perceptions, competencies, and patterns of behavior that determine the commitment to, and the style and proficiency of an organization's health and safety management. Organizations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety and by confidence in the efficacy of preventive measures.
7. Shared values (what is important) and beliefs (how things work) that interact with a company's people, organizational structures and control systems to produce behavioral norms (the way we do things around here).
8. Safety cultures reflect the attitudes, beliefs, perceptions, and values that employees share in relation to safety.
9. Safety culture is the set of beliefs, norms, attitudes, roles, and social and technical practices that are concerned with minimizing the exposure of employees, managers, customers and members of the public to conditions considered dangerous or injurious.
10. Safety culture is the concept that the organization's beliefs and attitudes, manifested in actions, policies, and procedures, affect its safety performance.

NIOSH / CPWR Safety Culture & Climate in Construction – 3:

SAFETY CLIMATE

11. Safety Climate is what happens on a day to day basis, sort of a snapshot of what's actually happening and how employees perceive how the company is actually implementing safety on the ground.
12. Safety climate is how things are being done, you know how it really is right now, and is it really being practiced? Is safety a major concern for the company, do they really care about safety or are they just talking about it?
13. Safety climate is more of an encouragement, enabling and giving people the tools and education. It is very much about support for the ability for people to perform their work safely.
14. Safety climate is the shared perceptions of the workforce at a given point in time as to the extent hazard identification and injury performance are important to the organization as perceived by their interactions with their direct supervisors.
15. The safety climate is the environment in which a company puts its safety culture to work. Like providing the tools and equipment necessary, maybe the resources on our job sites to create that environment in which people are allowed to work safely.

NIOSH / CPWR Safety Culture & Climate in Construction – 4:

- 16. Safety Climate is a leading indicator. It reflects how well the espoused safety program is ultimately integrated into the organization to support safe effective practices at the point of operation.
- 17. Safety climate is the objective measurement of attitudes and perceptions toward occupational health and safety issues.
- 18. Safety climate is a subset of organizational climate that measures through members' perceptions the degree of congruence between an organization's espoused values and policies and enacted practices.
- 19. Safety climate is the shared perceptions of organizational members about their work environment and, more precisely, about their organizational safety policies.
- 20. Safety climate reflects shared perceptions of the relative priority of safety compared to other competing organizational priorities.

Observations and (over-)generalizations (in no particular order):

1.
 - a. safety climate is a measure of workers' perceptions
 - b. safety culture reflects workers' attitudes & beliefs
2.
 - a. safety climate is rooted in the perceptions of the front-line workers and their immediate supervisors
 - b. safety culture describes the entire organization, possibly with distinct sub-cultures within the organization
3.
 - a. safety climate has been shown to be a valid leading indicator of safety-related work practices, including injuries
 - b. safety culture (that is poor) is often blamed for injuries in retrospect
4.
 - a. generic safety climate measures have been shown to be valid across multiple industries
 - b. safety culture employs many different measures, but their validity with respect to safety has not been established to the same degree as for safety climate

Observations and (over-)generalizations (in no particular order) – 2:

5. a. safety climate is struggling to validate [measures within specific hazardous industries and occupations](#); measurement equivalence is a problem under active investigation
b. safety culture can be measured reliably through [both quantitative and qualitative measures](#), but often is not
6. both safety climate and safety culture must be considered in their [industrial, occupational, and organizational contexts](#)
7. both safety climate and safety culture are extremely sensitive to a [comparison between the “espoused” policies for safety and the “enacted” practices of safety](#) in an organization
8. both safety climate and safety culture are dependent upon specific [improvements to safe work practices, safety equipment, work pace, or other policies or practices](#); in colloquial terms, both management and workers must “walk the talk”

Observations and (over-)generalizations (in no particular order) – 3:

9.
 - a. safety climate is a term more common to **researchers**
 - b. safety culture is more commonly used by **safety professionals, workers, and management**; the use of this term is widespread

10.
 - a. safety climate *tends* to have a **relatively** consistent definition across **industries, occupations, and organizations**
 - b. safety culture *tends* to have very **different** meanings between industries and **occupations, and between organizations within the same industry**; compare firefighters, to nuclear plant operators, to off-shore oil and gas drillers, etc.

Focus on measurement – adapted from Nunnally (1978):

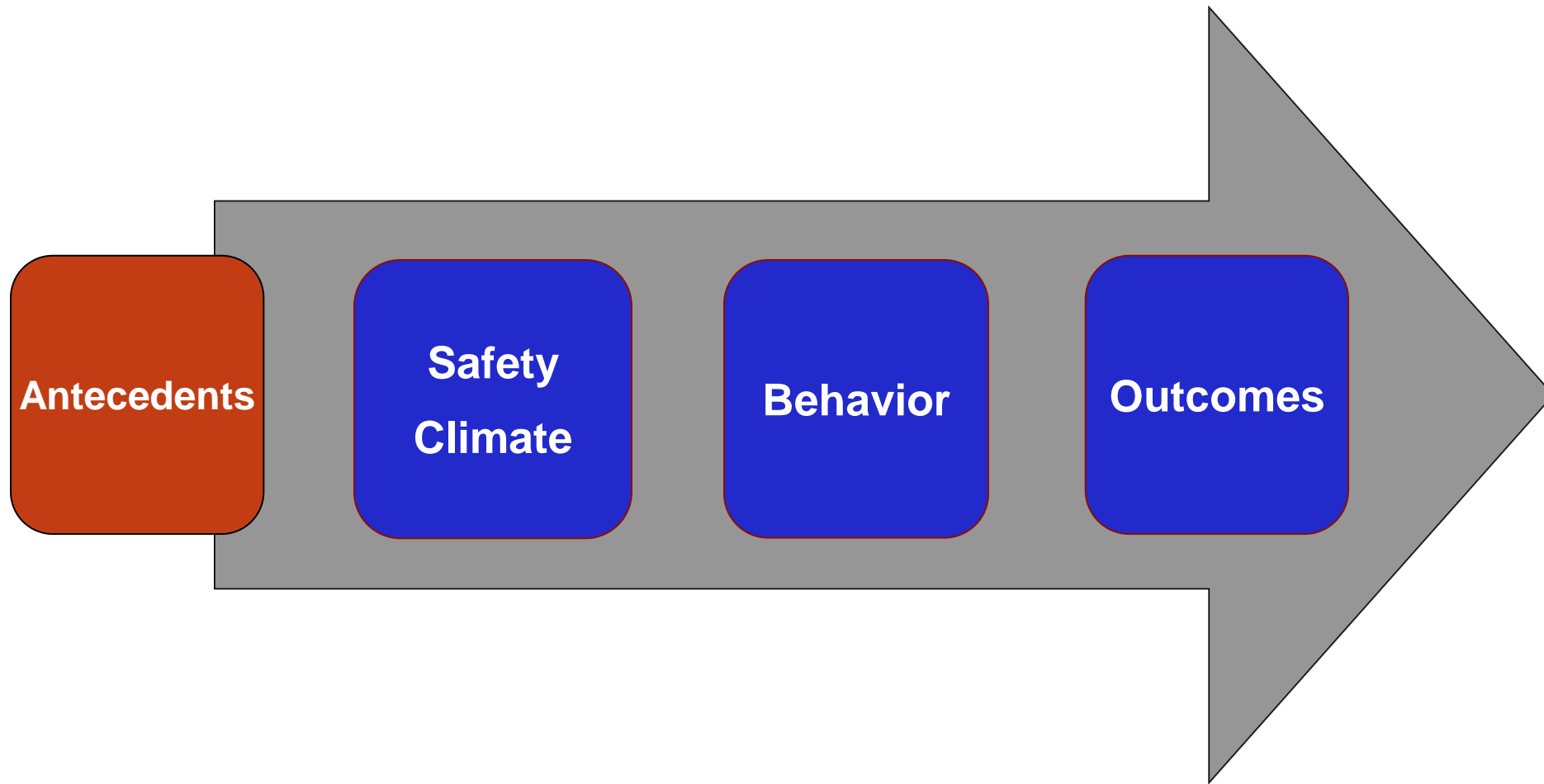
1. **judgments** – perceptions or assessments regarding the work environment by the workers and their supervisors; in principle, judgments are independently verifiable; in practice, workers doing similar jobs are regarded as the “judges” of the work environment; the degree of agreement among workers in a single crew is evaluated.
2. **sentiments** – attitudes, beliefs, or feelings about the work environment by the workers and their supervisors; sentiments are individual and not subject to verification, although similar sentiments may be shared by many workers or groups in an organization.

Judgment questions may often be influenced by individual sentiment; we make the effort to keep such questions as uncomplicated, and free from sentiment as possible.

Proposal for a temporary, interim solution to the definition problem:

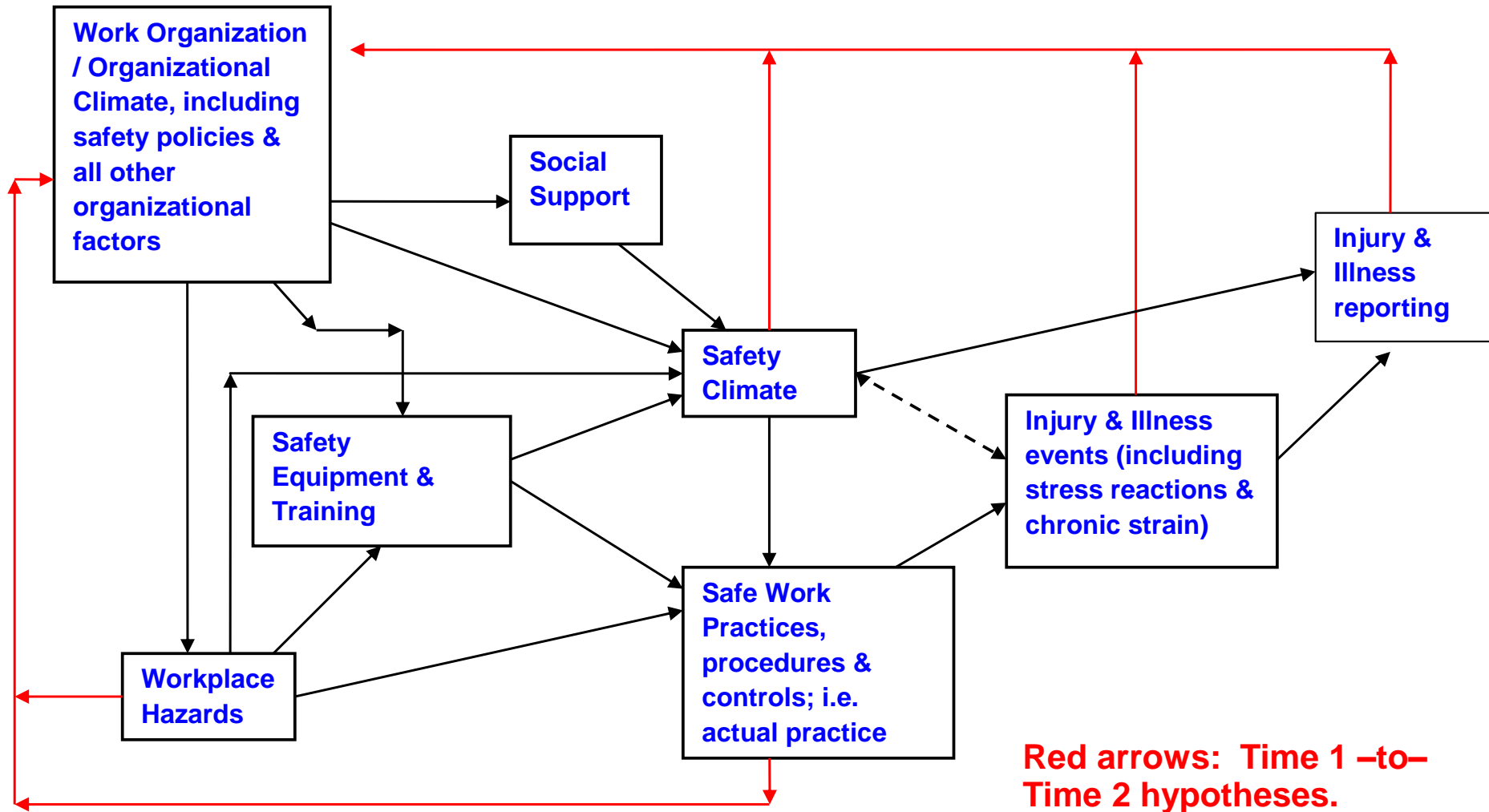
- We accept all measures of safety climate and safety culture that are replicable and in principle, verifiable. We also assess sentiments across groups of workers and organizations.
- We focus on the information derived from whatever measures we are able to obtain and replicate.
- We re-measure over time and look for indications of change (both positive and negative).
- We connect our measures of safety climate and safety culture to other assessments regarding the organization of work, management of safety, safe work practices, safety training, PPE, etc. In short, we examine safety climate and safety culture in context, and over time.

Intervention: Antecedents Perspective (conceptual model)



Adapted from D.M. DeJoy, "Some Thoughts and Perspectives on Safety Climate Interventions."
Orlando, FL., May 18, 2011

Organization of Work, Workplace Hazards, and Safety Climate, in Context: Organizational *and* Individual Levels of Analysis, Combined (testable model)



Dashed arrow: Controversial prediction/hypothesis. There is empirical evidence to support this prediction, but the evidence could be compromised by poor measurement.

Organizational and Individual levels of analysis: This model assumes that both organizational and individual levels of analysis are included within each construct.

Espoused policy to enacted practice (walking the talk):

- Job hazard/safety analysis often completed by safety professionals
- NIOSH recommends a Job Training Analysis (JTA, NIOSH, 2006):
 - developed by NIOSH researchers in mine safety and health
 - integrates **safety and health with production skills**
 - addresses risk within the **context of production, maintenance, and safety, considered together**
 - **conducted by the crew** (employees and supervisors) responsible for performing that task
 - revised or updated by that crew as the job changes
 - one job training analysis for every distinct task or duty



IC 9490
INFORMATION CIRCULAR/2006

Job Training Analysis: A Process for Quickly Developing a Roadmap for Teaching and Evaluating Job Skills

Department of Health and Human Services
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health



Goals of the JTA:

1. Every crew member agrees on the performance and safety standards for completing the task.
2. Promote both safety and productivity, such that the safest way to do the job is also the easiest and most productive way to get the work done [Baker et al. 1991]. This is prevention-through-design (PtD) with respect to how the work is organized.

Processes to implement the JTA:

1. **Prioritize** the development of JTAs beginning with the most critical and everyday functions, followed by less hazardous and infrequent activities.
2. Establish a process by which **front-line workers and supervisors periodically re-evaluate the existing JTAs** for accuracy with respect to current function. Modify existing JTAs as the jobs change.
3. Maintain records of current JTAs for consultation by all workers in the OCS environment and for active training for new workers.
4. Establish **regular (e.g. weekly) discussions between front-line workers and their immediate supervisors with respect to safety, productivity, and organizational issues**. Provide feedback and support to the supervisors to connect safe work practices with productivity planning.

Moving toward **leading indicators**:

A workplace that actively investigates safety incidents before they become injuries can prevent those injuries from occurring. Workplace safety is enhanced by the following (NIOSH, 2002, and 2011):

1. 100% incident and injury reporting,
2. *no-fault* incident and injury reporting, and
3. an active policy of **safe work practices** that are:
 - a. **customized** to each work environment, and
 - b. **pre-planned** into the work before the job has begun
4. **regular and continuing training**, for both employees and supervisors, with respect to hazards

Training style:

- learner centered training
- active participation
- problem solving
- discussions among/between co-workers
- crew-based solutions to problems
- encourage creative approaches to problems
- transfer of skills from experienced to less experienced job/task performers
- site-specific focus, especially with intact work crews:
 - discuss prior workplace hazards, problems, and the solutions developed
 - promote crew approaches to specific problems on-site

Training principles:

- front-line worker control is essential where hazards are present
- promote good communication, cooperation, and pre-planning between workers and front-line supervisors
- safety is a skill
- integrate safety with production as the performance standard, i.e. safety and productivity are *inter-dependent* in the work organization and processes
- subject-matter experts (including veteran workers) identify hazards and develop plans to reduce risk

Training principles - 2:

- hazard recognition:
 - is not simply identifying existing problems in the work environment
 - includes **anticipating incipient problems** that may be likely to develop
 - once identified, hazards can be **prioritized for elimination or mitigation**, with an emphasis on **reducing risk**
- **crew-based solutions** promote:
 - improved **safe-work practices**
 - **reduction in variability on critical tasks**
 - improved **safety climate**

Continued overall monitoring, assessment, and evaluation, that take place in addition to specific tasks using the JTA's:

- direct, individual assessment from workers, with summarized (“anonymized”) feedback to supervisors (Zohar & Polachek, 2013)
- establish a reference database with all incident, injury, and illness reports
- department- or organization-wide surveys on an annual basis, or as needed
- ongoing analysis of the data that are available
- continual improvement: safety, safe work practices, etc.
- continual evaluation and assessment of the process and outcome measures of safety and safety climate

Current state of the art, summary:

1. current research in safety climate and culture is very active and dynamic:
 - a. measures within specific industries and occupations are under development
 - b. measurement equivalence across different industries, occupations, and even across different demographics within the same trade has yet to be established (in most cases)
 - c. interventions and training evaluations are being tested but require additional research to be fully validated
2. safety climate is improved through specific improvements to safety and safe work practices within the organization
3. best recommendations available today are process-focused (not outcome-focused); in short, we can make recommendations regarding how to examine work processes, but not the specific improvements that should be implemented to improve safety climate.

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Thank You!

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